

Attorney Docket NC 84,294
Application Serial No. 10/662,163

Remarks/Arguments

Claims 1-32 are currently in the application. Applicants thank the Examiner for the indication of allowable subject matter, but will refrain at this time from making the suggested claim amendments based on the arguments given below regarding the base claims. Applicants will now address the rejections in the Office Action, as follows.

The rejection under 35 USC § 102(e)

Claims 1, 2, 4, 10-12, 14, 20-24, 26 and 32 are rejected as anticipated by Arvin et al. (US Pat. No. 6,496,713). The rejection is respectfully traversed.

The claims are directed to a magnetic field gradiometer detector comprising a transmitter, a receiver, a probe, and a switch that alternately connects and disconnects the receiver and the transmitter to the probe in switching between a transmitting mode and a receiving mode. The probe includes a gradiometer coil array having a first surface coil and a second surface coil wound in an opposite sense. The coils are configured asymmetrically such that the probe projects a magnetic field in the outside detecting region adjacent to the first side while it is self-shielded on the second side of the probe.

The term "asymmetric" in the claims is defined in the present specification to mean that the coils are non-identical, that is, at least one coil of the plurality of coils has a different geometry, different number of turns or windings, or differs in some other physical or operating parameter from the other coil or coils of that embodiment (page 7, lines 8-11). The coil asymmetry must furthermore provide the property that a magnetic field is projected in the detecting region outside the probe, the detecting region being adjacent to the first side, i.e. one side, of the probe, while also providing self-shielding on the opposite side of the probe.

The device described in Arvin et al. is a different type of device that operates on a much different principle. It is designed for detecting ferromagnetic foreign bodies within a patient undergoing MRI. None of the coil configurations are asymmetric within the meaning of the present invention, in that they are not designed or arranged to form a probe with a detecting region outside the probe or coil array. The region containing the

Attorney Docket NC 84,294
Application Serial No. 10/662,163

magnetic sensor resides within the coil pairs, which are therefore designed to substantially zero out the magnetic field between the coils. Furthermore, unlike the present invention, Arvin et al. discloses no region on a side opposite the outside detecting region that is self-shielding owing to an asymmetric coil configuration. The description in Arvin et al. referred to in the Office Action as teaching this claim limitation actually teaches a "detector assembly whose applied field coil is geometrically configured such that almost no magnetic field occurs at a location where the magnetic sensor is positioned in relation to the field coils (emphasis added; Arvin et al., col. 8, lines 8-11). Arvin et al. at col. 9, lines 7-53, further describes this region as located between, not outside, the pair of coils (PC boards 14 and 16), unlike the present invention. This is accomplished with symmetrical coils or PC boards (see Arvin et al., col. 9, lines 23-60 and Figs. 1-3, and note in Fig. 3 the top coil is described as "removed to show sensor positioning", col. 10, lines 5-6, i.e. for ease of illustration only), again unlike the present invention.

The other embodiments described in Arvin et al. and relied on in the Office Action are also deficient and do not anticipate the claims. Arvin et al. at cols. 11-12 and Fig. 5 describes a detector assembly in which the diameters and turns in the coils "are adjusted so that the magnetic field . . . cancels . . . in a region near the common center of the two coils" (col. 11, lines 46-51), which is again a region within, not outside, the coils. Addressing yet another aspect of the Office Action, it is noted that Figs. 6 and 7 do not disclose the limitations recited in the present claims.

Arvin et al. therefore does not teach self-shielding as in the invention. In Arvin et al., the region where the magnetic field is cancelled is very small and is limited to the region of their receiving sensor or reciprocally at the transmitting coil. This is not self shielding on the probe side as in the present invention, which shields signals from entering into and interfering with the detector, not the cancellation of a signal in the detector as in Arvin et al.

There is therefore no teaching in Arvin et al. of an outside detecting region, a self-shielded opposite probe side, or the switch as recited in the present claims.

A rejection on the grounds of anticipation is proper only when every limitation recited in a claim is disclosed in the single reference. Since the cited reference does not

Attorney Docket NC 84,294
Application Serial No. 10/662,163

fulfill this requirement, Applicant respectfully requests that the rejection on this ground now be withdrawn.

The base claims and the dependent claims are allowable for the reasons set forth above, and the dependent claims also for the additional limitations recited therein.

Applicants respectfully submit that the claims presently submitted are allowable for the reasons stated above and request that a timely Notice of Allowance be issued in the case. The Examiner is invited to contact Applicants' attorney at the number indicated below should further discussion help advance the case to issuance.

Kindly charge any additional fee, or credit overpayments, to Deposit Account No. 50-0281.

Respectfully submitted,



L. George Legg
Reg. No. 34,208
Attorney for Applicants

Date: February 2, 2005
Telephone: 202-404-1559